Five Years of Competitive and Stable Real Exchange Rate in Argentina, 2002-2007*

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Abstract

This article argues that the macroeconomic regime focused on the preservation of a stable and competitive real exchange rate (SCRER) has been the principal factor explaining the rapid growth experienced in Argentina during 2002-2007. This policy promoted economic growth not only by preserving external and fiscal accounts sustainability, but also by providing incentives to the tradable sector and thus encouraging the expansion of its production, employment and investment. Monetary and exchange rate policies aimed at preserving a SCRER collides with conventional wisdom, particularly with the trilemma paradigm. We argue that the critiques based on such a paradigm may fail to hold in situations of excess supply of foreign currency and show the conditions under which the SCRER policy is sustainable. We also outline the main characteristics of a macroeconomic regime targeting a SCRER in which monetary, exchange rate and fiscal policies are coordinated.

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1. Introduction

In 1991, Argentine authorities established the convertibility regime, which implied the fixation of the peso (AR$) to the US dollar ($) by law and the validation of contracts in foreign currencies. The new monetary arrangement also stipulated that the central bank must fully back the monetary base with foreign reserves[1], what in practice turned the central bank into a currency board. The convertibility regime was the pillar of a broader stabilization program, intended to take the economy away from the high inflation regime settled since mid seventies, which had led to two brief hyperinflationary episodes in 1989 and 1990. The program also included an almost complete liberalization of trade flows and the full deregulation of the capital account of the balance of payments. It was jointly applied with an impressive process of market-friendly reforms, targeting the privatization of a large proportion of state-owned firms.

The program successfully managed to stop inflation and initially spurred rapid growth. However, as happened with many other stabilization programs in the region it led to the appreciation of the real exchange rate, which made economic growth highly dependent on external debt accumulation[2]. Since the Asian and Russian crises and especially after the Brazilian devaluation in 1999, the deceleration of capital inflows put the economy into a deflationary trend that ended up in a financial and external crisis in 2001-02. Between the last days of 2001 and the beginning of 2002, Argentina declared the default of its international debt and devaluated the peso. The collapse of the convertibility regime implied a 21% contraction in GDP with respect to the peak of mid-1998 and a rise in the unemployment rate up to 21.5%, leading half of the population below the poverty line.

However, only one quarter after the devaluation and default economic activity gradually started to recover. By the end of 2002, once the government managed to stabilize domestic financial markets, the recovery gained momentum and since then the economy has shown an impressive performance. In five years -from the first quarter of 2002 to the same period in 2007- GDP has been growing at 8.1% annual rate, reaching a peak 18.1% higher than the one in mid-1998. The investment rate rose up to 22% of GDP (on seasonally adjusted basis), which is the maximum range of the official time series beginning in 1993 and continues growing at a higher pace than GDP. During these five years exports have expanded at a slightly higher rate than GDP, but its pace of growth has substantially increased from mid-2004 onwards.

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[1] In 1992 the new central bank law slightly relaxed this constraint by setting narrow margins to the possibilities of purchasing public bonds and lending to the commercial banks.

[2] For an analysis of the macroeconomic performance during the convertibility period see Damill and Frenkel (2007).

Current economic evolution contrasts with Argentina's economic performance of the last sixty years. Since post Second World War economic growth has been low and very volatile, especially in the second financial globalization period beginning in the mid seventies. For the first time in thirty years Argentina is growing five years in a row. More importantly, current expansion is based on solid macroeconomic fundamentals. The volatility of Argentine growth has been typically associated to current account and fiscal deficits. Between the mid forties and the mid seventies, macroeconomic evolution was characterized by stop-and-go cycles related to external imbalances. During the second financial globalization period, the availability of external funds momentarily relaxed the external constraint to growth, but it led to two episodes of explosive fiscal and external debt accumulation, [3] one in the late seventies and the beginning of the eighties and the other during the convertibility regime period.

In contrast to those traditional fiscal and external imbalances, the current macroeconomic configuration stands out with the existence of external and fiscal surpluses. Certainly, the debt restructuring in 2005 –implying a $ 67 billion reduction in the nominal stock- softened both external and fiscal requirements releasing resources for private sector spending. Similarly, favorable external conditions -specially the high prices of some commodities- have also contributed. However, in our view the main factor behind the current success lays on the official policy aiming at preserving a stable and competitive real exchange rate (SCRER). The SCRER has been a key factor explaining the current account adjustment, which passed from a $ 14.5 billion deficit in 1998 to $ 7.6 billion surplus in 2006. From this $ 22 billion adjustment, $ 20 billions came from the improvement in the trade balance, which is mainly attributable to the effects of the exchange rate depreciation.

The influence of the SCRER on the fiscal accounts performance has also been important. After devaluation, the government introduced taxes on traditional exports, mainly agricultural products and oil. In practice, this measure implied the introduction of multiple exchange rates that contributed to reduce the pass-trough of devaluation to wage-goods prices, but also to capture part of the rent that these sectors obtained from the competitive real exchange rate. In 2006, the federal administration recorded a primary surplus of 3.5% of GDP and a total surplus of 1.8% of GDP, from which taxes on exports accounted for 63% of the former and 122% of the latter.

In our view, the positive effects of the SCRER policy are the principal factors explaining the rapid growth experienced so far. This policy promotes economic growth not only by preserving external and fiscal accounts sustainability, but also by providing incentives to the tradable sector and thus encouraging the expansion of its production, employment and investment. Although the success of the SCRER strategy along these five years has undoubtedly

[3] An analysis of the evolution of Argentine debt, default and restructuring can be found in Damill, Frenkel and Rapetti (2005).

had a persuasive impact among analysts, skepticism remains.[4] The SCRER policy collides with conventional wisdom, particularly with the trilemma paradigm.

In this paper, we argue that a macroeconomic regime based on a SCRER is both desirable and manageable for a developing open economy. Next section describes the evolution of monetary and exchange rate policies in Argentina in the post-convertibility period. Section 3 discusses the usual criticisms against the SCRER policy and shows the conditions in which this policy is sustainable. Section 4 presents some concluding remarks regarding the management of a macroeconomic regime with a SCRER as an intermediate target.

2. Monetary and exchange rate policies in the post-convertibility period

The deceleration of capital inflows that led to the 2001-2002 crisis began in mid-1998. This process took place simultaneously with a persistent rise of the sovereign risk premium. However, the divergent trends in the domestic financial market that triggered the collapse of the convertibility regime only started in October 2000, associated with the political turmoil caused by the Vice-President's resignation. The process followed a simple dynamics. Devaluation expectations and the perception of a higher risk of default led private sector to withdraw deposits and ran against central bank's international reserves. There were no bankruptcy reports of failing banks because the central bank supported the liquidity of the banking system. Despite several signals issued by the government aiming at changing the expectations, the intensification of this process could not be stopped. In December 2001 restrictions on capital outflows and on the withdrawal of deposits (the so-called 'corralito') were established.

After the abandonment of the Convertibility regime, the government aimed to restrain the capital outflow and stabilize the foreign exchange (FX) market by introducing a dual exchange rate regime. The idea was to use this scheme only temporarily, in order to stabilize the nominal exchange rate while the domestic prices absorbed the impact of the devaluation, and then pass to a floating rate regime. The authorities also decided to convert to pesos most of domestic debts contracted in dollars (bank credits, rents, etc.) at a AR$/$ 1 rate (plus indexation to CPI inflation), thus neutralizing most of the effects of relative price change on the debtors' balance sheets. In contrast, banks' deposits originally denominated in dollars were 'pesoificated' at a AR$/$ 1.40 rate (plus indexation to the evolution of CPI inflation).[5] Together with the 'pesoification', the authorities unilaterally decided to extend the maturity and duration of all deposits, including those originally contracted in pesos. In exchange, private depositors received certificates for the reprogrammed deposits.

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[4] By mid-2007 energy supply shortages raised concerns about the sustainability of high rates of economic growth. These concerns, however, are not related to the SCRER policy.

[5] Later on, the government issued new debt to compensate the banks for the balance sheet effect of the asymmetric 'pesoification'.

In February 2002, the FX market was unified and the peso started to float freely. Given the political and economic uncertainty, the exchange rate skyrocketed fed by self-fulfilling expectations. Interestingly, this process developed in an illiquid environment because of the restrictions on the withdrawal of cash from banks. The erratic monetary policy followed in the first quarter of 2002 neither contributed to stabilize the exchange rate. The authorities delayed the launching of a domestic asset that could perform as a potential substitute for foreign currency. Given the distrust in banks and in the Treasury, the economic depression and the growing inflation, the international currency appeared as the only asset available to allocate financial savings. Only two and half months after the devaluation the central bank started to issue notes (the Lebac) in order to supply a financial instrument that could compete with the dollar.

All these factors contributed to deepen the perverse dynamics of the financial variables during the first semester of 2002. The capital flight from domestic assets between March 2001 and mid-2002 is illustrated in Graph 1, which shows the large fall in private bank deposits[6] and international reserves, while the nominal demand for cash remains stagnant. These developments provide evidence for the substitution of local assets (cash and deposits) in exchange for external assets (international reserves).

<Graph 1 here>

The result of the asset substitution affected the FX market. The nominal (NER) and real exchange rate (RER)[7] rose continuously along the first semester of 2002 (around 260% and 180%, respectively). Their paths are shown in Graph 2. Real exchange rate overshooting was so pronounced that in June 2002 its value was almost 193% higher than the 1980/2001-period average value, and 309% higher than the convertibility decade average.

<Graph 2 here>

These disruptive trends began to revert in July 2002. The turning point was the exchange rate stabilization. Several factors contributed to this outcome. Controls on FX transactions[8] had been introduced in November 2001 -before the convertibility collapse- and they were further tightened in March 2002. Since June 2002 controls and interventions in the FX market were strengthened in order to conduct a systematic policy to stabilize the exchange rate. The decision that export revenues surpassing $ 1 million had to be sold directly to the central bank was especially important in this regard. This became the main source of international reserves

[6] Graph 8 shows a 'jump' in the private bank deposit series in January 2002. It reflects the accounting effect of the 'pesoification' at 1.40 pesos per dollar of deposits issued in foreign currencies, previously valued at a $/U$S 1 rate. If we put this mere accounting effect aside, it is easy to see the drop in deposits.
[7] Exchange rates are defined so that a rise in this variable implies a nominal or real depreciation.
[8] They included the obligation to surrender the proceeds from exports in the local FX market.

accumulation for the monetary authority, which in turn permitted to increase the volume of its interventions in the FX market.

Financial market behavior itself also contributed to stop the bubble in the exchange rate. On the one hand, local interest rates skyrocketed (see Graph 3). In July 2002, the average time deposits annual interest rate reached a 76% peak, and the annual interest rate of the 14-day Lebacs reached almost 115%. Thus local financial assets began to appear more attractive as substitutes for the dollar. On the other hand, as mentioned above, the real price of the dollar reached very high and 'abnormal' levels in historical terms (i.e. the prices in dollars of domestic assets, non-tradable goods and salaries were perceived as abnormally low). In this context, once the authorities managed to stop the exchange rate bubble in July, the public rapidly changed expectations and the market started to show an appreciation trend.

<Graph 3 here>

Thus, in the second half of 2002 a phase of monetary and financial variables normalization started. After reaching a peak of almost AR$/$ 4 during the last days of June, the exchange rate began to experience a smooth nominal appreciation trend. Although the inflation rate was already low and decelerating, the rise in domestic prices contributed to the real appreciation. In that context, local assets became increasingly attractive. Bank deposits began to grow, as also did the demand for Lebac, local shares and the demand for cash (Graph 1). This portfolio substitution in favor of local assets resulted in a persistent drop in the interest rates (Graph 3).

The normalization in financial activity dissipated disrupting expectations and thus favored the recovery of private expenditure. Interestingly, this recovery took place without significant contribution from bank credits. Even though, private deposits gradually improved allowing the recuperation of banks' liquidity, credit to private sector continued shrinking until late 2003. The financial crisis appeared to have persistent effects on the behavior of bank credit, which at the beginning of 2007 was still below the peak reached on in 1998.

<Graph 4 here>

Domestic expenditure was mainly financed by private sector cash holdings. Graph 5 shows the increase in cash holdings since the fourth quarter of 2001. Both the monetary base/GDP ratio and the monetary base/total bank deposit ratio showed very high rates of growth and also relatively high levels in comparison to the convertibility period. Although the low interest rates on banks' deposits (and the tax on financial transactions) have contributed to that performance, this behavior seems to be another persistent consequence of the financial crisis.

<Graph 5 here>

The nominal and real appreciation process stopped around mid-2003, when the government decided to manage the flotation of the exchange rate in order to preserve the SCRER. The effects of the SCRER on economic activity, employment and external and fiscal accounts were demonstrating to be highly favorable. Thus, the government gradually started to recognize and make explicit reference to the importance of preserving the SCRER in the official economic strategy. On the contrary, central bank authorities never made any explicit statement regarding the existence of any exchange rate target. According to their official statements and documents, the permanent intervention in the FX market has been oriented to accumulate international reserves for precautionary purpose, namely to protect the economy from international capital markets volatility. Statements aside, the joint intervention of the central bank and the Treasury in the FX market actually controlled the price of the dollar in a narrow range between AR$ 2.8 and AR$ 3.1. The resulting fluctuation of the exchange rate in this interval made the multilateral real exchange rate remain stable around a level 129% higher than the one at the end of the convertibility regime. The bilateral real exchange with the US dollar also remained stable for some years, but since early 2005 it has been showing a soft appreciation trend (Graph 2).

In 2002, when the Congress passed a law revoking the currency board, the government decided to keep central bank's independency with the mandate of pursuing low inflation rates as its primary mission. Given that the economy was still absorbing the effects of the crisis and the devaluation and that the domestic financial markets had shrunk significantly, the central bank disregarded the option to follow an inflation targeting regime. The transmission mechanisms through the interest rate on aggregate demand were thought to be uncertain and weak[9]. Instead, the authorities opted to follow a more pragmatic policy based on broad quantitative monetary targets. From 2003 on, targets have been announced at the beginning of every year throughout the central bank monetary programs, in which the authorities commit themselves to maintain monetary aggregates within a certain range. Given the uncertainty surrounding the effects of monetary policy, the central bank has tended to set these ranges sufficiently broad. However, their upper levels resulted systematically lower than the monetary expansion arising from the intervention in the FX market to preserve the SCRER. Thus, since 2003 the central bank has dealt with two 'conflicting' objectives: the preservation of a competitive exchange rate by intervening in the FX market and at the same time the attainment of the targets of monetary expansion announced in the monetary program.

The tension between these two policy objectives can be observed in Table 1, which shows the sources of variation of the monetary base. In the first semester of 2002 the central bank intervened in the FX market providing dollars to contain the depreciation pressures. Thus, the FX intervention operated as a source of monetary base contraction. Once the exchange rate was

[9] For instance, the effects of the interest rate through the credit channel are very weak in an economy where the bank credit to private sector remains below 13% of GDP as in Argentina.

stabilized, the accumulation of international reserves resulted, on the contrary, in a source of monetary expansion. During the second semester of 2002, this source of monetary expansion was easily absorbed by the rapid growth in the demand for cash caused by the re-monetization of the economy. However, since 2003 the gradual deceleration of money creation established in the monetary programs in order to maintain inflation expectation under control started to conflict with the increasing expansion of monetary base generated by central bank's intervention in the FX market aiming to preserve the SCRER. Since the amount of monetary base created to intervene in the FX market (first column in table 1) exceeded the actual expansion of the monetary base to accomplish the monetary targets (second column), an 'excess' of monetary expansion (third column) had to be absorbed.

<Table 1 here>

This 'excess' of monetary expansion has been absorbed through several mechanisms. Along 2003, the sterilization operations implemented by the issuing of central bank notes were especially relevant. The need for sterilization increased during 2004 and 2005. However, the central bank could limit the issuing of Lebac because other compensatory mechanisms began to operate. In the first place, as liquidity grew the banks started to service the debt incurred with central bank during the financial crisis. Hence, banks capital payments and especially the payment of interests operated as a source of monetary base contraction. In 2005, the central bank launched a program allowing the acceleration of banks' debts amortizations, reinforcing this contractionary mechanism. By early 2006 most banks had cancelled their debts with the monetary authority.

The Treasury also helped to absorb the 'excess' of monetary expansion. While in 2002 a net flow of financing from the central bank to the Treasury was observed, in 2003 and especially since 2004, the transactions between the Treasury and the central bank operated as a source of contraction of the monetary base. Treasury's purchases of international reserves with the proceeds of the primary surplus gave place to a monthly average contraction of the monetary base of AR$ 543 millions in 2004. The main purpose of these operations was to continue servicing of the debt with the multilateral financial institutions. The Treasury and other official agencies also accumulated part of the fiscal surplus in foreign currency and thus intervened directly in the FX market to alleviate central bank's management of the 'conflicting' objectives. These operations started in late 2002 and gradually expanded afterwards, thus becoming an important policy instrument (see last column of Table 1).

In 2005 the sterilization needs through the issuing of Lebac increased again. Thus, in order to soften the appreciation pressures in the FX market, controls on the capital account were introduced in June. Basically, the new measures established that all capital inflows –excluding the issuing of new private and public debt, international trade financing and foreign direct

investment- would be subject to a 30% unremunerated reserve requirement for at least 365 days. This strategy is inspired by that applied in Chile in the early nineties and attempts to reduce short-term capital inflows. However, controls left open ways to avoid the reserve requirements. For instance, capital inflows can easily circumvent the reserve requirement by operating through the stock exchange market (by buying domestic assets abroad and selling them in the local market). There has been no evidence of a reduction in the supply of dollars in the FX market after the measures were implemented. Local analysts believe that controls are ineffective and even the authorities do not reject the idea that they were introduced more as a signal of the official willingness to maintaining the SCRER strategy rather than as an effective control mechanism.

As from 2006 monetary policy stopped targeting the monetary base and started to focus on M2. The authorities argued that the change in the target was due to the increasing monetization of the economy and the gradual recovery of bank credit. In these conditions, it was argued, the use of a larger monetary aggregate represented a step forward toward the fine-tuning of monetary policy. In practice, the switch of the monetary aggregate target helped to relax the conflicting management of exchange rate and monetary policies. Central bank was facing increasing difficulties to accomplish the monetary base targets. As Table 1 shows, the 'excess' of monetary expansion had risen substantially between 2003 and 2005. The use of M2 as a target gave the authorities greater flexibility to conduct the two-target policy, allowing for greater intervention in the FX market and expansion of the monetary base.

In sum, during the post-convertibility period the central bank has been able to conduct the two-target policy successfully. Moreover, while doing so it has obtained quasi-fiscal surpluses every year. Some analysts have argued that the management of monetary policy focusing on two targets has had an inflationary bias. Certainly, inflation accelerated during 2004 and 2005 and has remained stable around an annual rate of 10% since 2006. In our view, the acceleration of inflation is due not to inconsistencies in the management of monetary and exchange rate policies, but to the lack of coordination between these and the fiscal policy. The expansion of public spending well above the increase of tax revenues since 2006 has implied an expansionary fiscal impulse to an already fast-growing aggregate demand. Given the fact that monetary and exchange rate policies focus on preserving a SCRER –which is intended to put the economy in high growth path- fiscal policy is the only macroeconomic instrument available to moderate aggregate demand when inflationary pressures arise.

3. The Economics of SCRER

The notion that a SCRER favors economic development has a long tradition in economic theory. Advocates of the outward orientation approach to development during 1960s and 1970s pointed to the SCRER as key element for that strategy (Balassa, 1971 and Díaz Alejandro, 1979). According to this view, a competitive real exchange rate boosts economic growth because it

softens the balance of payment constraint and favors the development of tradable activities, which tend to be more dynamic. The stability of the exchange rate is also important because low volatility reduces the risk and uncertainty of investment in tradable sectors. These arguments have been recently revitalized by modern scholars[10]. Besides the traditional effects, modern advocates also emphasize that a development strategy based on a SCRER is market friendly (avoiding rent-seeking practices) and compatible with free trade agreements. In recent years, many studies have documented a statistically and economically positive relationship between growth and real exchange rates[11].

The preservation of a SCRER has also been invoked for other reasons. Maintaining a competitive real exchange rate typically involves intervention in the FX market and the accumulation of international reserves. It is a well documented fact that international financial integration may lead to macroeconomic instability and increases the likelihood of external crises. Some scholars argue that international reserves accumulation serves as a shield against volatile capital flows, especially for developing countries (Feldstein, 1999). Empirical studies show a positive relationship between reserve accumulation and growth (Polterovich and Popov, 2002).

Another less studied motive is that competitive real exchanges rates promote job creation. Besides the above mention growth effects, a SCRER may impact on employment through a more intense use of labor (Frenkel, 2004). A competitive parity favors labor-intensive activities and sectors and also the substitution of expensive inputs (such as imports) in favor of labor across sectors.[12]

Probably because of all these reasons, the preservation of a SCRER does not attract much criticism by itself. Few scholars deny the beneficial aspects of stable and predictable relative prices and the positive effects on growth. In some cases, welfare arguments against public intervention in the FX market are raised. But the optimality of the free market determination of the exchange rate and the argument that the public sector has no informational advantage over the private sector are not very appealing ideas in the specialized discussion about exchange rate regimes and policies. The apparent volatility of capital flows and the instability and unpredictability of free-floating exchange rates greatly lessen the relevance of those ideas (Frankel and Rose, 1995). Moreover, in some scholars' view the free-floating exchange rate indeterminacy and unpredictability is precisely the deeper foundation of the need for managing the exchange rate (Blecker, 2005). This is particularly emphasized in countries in which the real exchange rate plays a crucial role in the economic performance.

Skepticism towards the SCRER policy points to the ability of governments to conduct it. The main objection is that the real exchange rate –as any real variable- is not under the

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[10] The literature emphasizing the positive effects of the SCRER on development increases day by day. See, for instance, Williamson (2003), Rodrik (2005), Dooley, Folkerts-Landau and Garber (2004), Frenkel (2004), Frenkel and Taylor (2005), Subramanian (2007).

[11] See Hausman, Prichet and Rodrik (2005) and Prasad, Rajan and Subramanian (2007).

[12] See Frenkel and Ros (2006) for an analytical and empirical study of the positive relationship between real exchange rate and employment in Latin America.

government's control, at least in the long run. However, given the weak empirical support of real exchange rate determination models,[13] the objections relevant for economic policy formulations are based on the trilemma or impossible trinity argument. The trilemma says that it is impossible for a country to simultaneously maintain free capital mobility, active monetary policy and the ability to manage the exchange rate. One of these features must necessarily be given up. In other words, the trilemma says that in an economy open to capital flows it is impossible for the authorities to simultaneously control the exchange rate and the interest rate (or the monetary base).

There are at least two ways to express the objection to the SCRER policy based on the trilemma. One of them argues that targeting the exchange rate implies a central bank intervention in the foreign exchange market. In doing so, the central bank looses its ability to control money supply. Targeting the exchange rate and controlling the money supply can be simultaneously pursued only if capital flows are regulated. However, the effectiveness of capital regulation tends to decrease, because the private sector innovative capacity is greater than the public sector regulatory ability. The conclusion is that central banks have to choose between two poles (Fischer, 2001): active monetary and floating exchange rate or hard peg cum passive monetary policy.

The second way to express the objection focuses on the argument of controlling inflation. If the interventions in the exchange market target the real exchange rate (instead of the nominal exchange rate), no nominal anchor remains for the public to configure inflationary expectations. Since the central bank cannot control the money supply, the inflation rate is completely out of control.

The trilemma is essentially a policy argument, logically derived from interest rate parity theorems for open economies. When forwards exchange markets are not fully developed the relevant theorem is the uncovered interest parity (UIP) condition. The UIP states that the returns of two perfect substitutes assets nominated in different currencies should be equal. This implies that the domestic interest rate (i) should equalize the sum of the foreign interest rate (i^*) and the expected variation of the nominal exchange rate ($E(\dot{S}) = \frac{S_{t+1}^E - S_t}{S_t}$). With the additional assumptions of small country ($i_t^* = i^*$) and perfect foresight ($S_{t+1}^E = \bar{S}$), the UIP condition formally implies:

[13] Evidence regarding short-run indeterminacy of the real exchange rate seems to be conclusive. Its behavior is almost completely determined by nominal exchange rate. Although most scholars agree about the existence of an equilibrium real exchange rate in the long run, there is no consensus regarding the factors affecting its determination. The purchasing power parity (PPP) is the most accepted hypothesis (Taylor and Taylor, 2005). However, evidence regarding the PPP shows time series reverting to their means in very long periods (i.e. half life of 3-5 years) and results are highly sensitive to data sets and estimation techniques. On the other hand, mean-reverting time series is no sufficient condition for the validity of PPP hypothesis.

$$i_t = i^* + \frac{\bar{S}}{S_t} - 1 \qquad (1)$$

Equation (1) is a simple model with two unknowns: the domestic interest rate and the exchange rate (S_t). Under a credibly fixed exchange rate regime ($S_t = \bar{S}$), the model is solved by determining the interest rate endogenously equal to the international rate. In other words, the government is able to set the exchange rate but looses the control on the monetary policy. When the exchange rates floats freely, equation (1) is solved by setting the domestic interest rate exogenously. This is the case in which governments have an active monetary policy at the cost of letting the exchange rate float. If both the interest rate and the exchange rate are exogenous, equation (1) is over-determined. The only way to avoid this situation is to consider the imposition of capital controls, which prevent arbitrage forces to make the parity hold.

In any model, conclusions critically depend on the assumptions. In the case of the trilemma one crucial assumption is that assets are perfect substitutes. If this assumption is relaxed the validity of the trilemma as a general theorem characterizing the performance of economies open to capital flows no longer holds.[14] Moreover, it has been recognized for long time in open economy macroeconomics that in contexts of free capital mobility central banks have room to conduct active monetary policy and control nominal exchange rate when assets are imperfect substitutes[15]. The degrees of freedom of monetary policy vary inversely with the degree of assets substitutability.

The degrees of freedom of monetary policy also depend on the institutional characteristics of the central bank, and the situation of the FX market. In a case of excess supply of foreign exchange at the targeted exchange rate, if the central bank is allowed to issue bonds to sterilize, it can control both the prevailing exchange and interest rates by purchasing all the excess supply of international currency in the FX market and sterilize the monetary effect of that intervention through the issuing of bonds in the monetary market. The Central Bank has two available instruments to perform its two targets: the intervention in the exchange market to control the exchange rate and the intervention in the money market to control the interest rate. Tinbergen's maxim is fulfilled. The excess supply of international currency, at the exchange rate targeted by the central bank, implies an excess demand for domestic assets at the prevailing domestic interest rate. The fully sterilized intervention in the exchange market can be imagined as a policy implemented in two steps. In the first one, before sterilization, the central bank intervention generates a monetary base expansion. The resulting situation would show a higher amount of monetary base, the same amount of domestic bonds and an interest rate lower than the initial one. In the second step, the complete sterilization fully compensates for the change in the

[14] Another key assumption is that exchange rate expectations are formed with perfect foresight. If departures from the perfect foresight-rational expectation paradigm are considered, the predictions of the trilemma may not longer hold. For a critique of the trilemma in this vein see Frenkel and Rapetti (2007).
[15] See for instance chapter 10 of Dornbusch (1980).

private portfolio that took place in the first step. The central bank absorbs the increment in the monetary base and issues an amount of domestic assets equal to the initial excess demand for domestic assets (the excess supply of international currency) turning the domestic interest rate to its previous level (Bofinger and Wollmerhäuser, 2003).

Therefore, if assets are imperfect substitutes and sterilization is allowed, central bank's ability to simultaneously manage the exchange rate and the interest rate critically depends on the existence of an excess supply of international currency at the targeted exchange rate. In this setting the trilemma is invalid. It seems that this conclusion is not generally acknowledged because the literature discussing monetary autonomy and exchange regimes rarely considers situations of excess supply of international currency. It is mostly focused on balance of payments deficit situations[16].

Certainly, in excess demand contexts the predictions of the trilemma are generally valid. Even when assets are imperfect substitutes, in these situations even powerful central banks have a limited capacity to intervene in the FX market. The limit is determined by the stock of international reserves. Consequently, it may be argued that even powerful central banks cannot simultaneously control the exchange rate and the interest rate in contexts of excess demand for international currency. But there is no symmetry between excess demand and excess supply situations. In the first case the trilemma is valid while not necessarily in the second one. The asymmetry lies in the fact that in the first case sterilization is constrained by a fixed stock (i.e. the international reserves), while in the second sterilization may be done indefinitely because of a variable stock (i.e. central bank's bonds). Central bank's ability to issue bonds but not international reserves is the key difference.

This ability raises the question whether is possible to carry the fully sterilized intervention policy under excess supply of foreign currency situations permanently. In order to do so, the central bank has to fulfill a sustainability condition: its net worth should not follow an explosive trend. Sustainability therefore depends on the magnitudes of the international and the domestic interest rates and on the rate of variation of the nominal exchange rate. Taken as given the international interest rate and the trend of the nominal exchange rate, the sustainability condition depends on the domestic interest rate. The central bank enjoys autonomy to determine the domestic interest rate, but in order to be sustainable the policy must determine domestic interest rates lower than a certain upper limit. This limit can be formally determined as follows.[17] Assume a central bank that holds international reserves (R) as its unique asset and issues monetary base (H) and remunerated liabilities (L) yielding the domestic interest rate set by the monetary authority (i_t). Therefore, central bank's net worth (N) at any point in time would be:

$$N_t = S_t R_t - (H_t + L_t) \qquad (2)$$

[16] See, as an example, Canales-Kriljenko (2003)
[17] The complete model is in Frenkel (2007).

In each period, the central bank earns the yielding of international reserves -which for simplicity we assume are invested at the international interest rate- and serves the interest payments of its remunerated liabilities. There is also a valuation effect on the international reserves due to the variation of the exchange rate ($\dot{S}$). Since the changes in the stocks cancel out, central bank's quasi-fiscal result is equal to the variation of its net worth.

$$dN = SR(i^* + \dot{S}) - iL \qquad (3)$$

A simple (although restrictive) condition for the central bank's net worth not to follow an explosive trend is to assume that the quasi-fiscal result has to be non-negative ($dN \geq 0$). Under this sustainability condition, we obtain the maximum domestic interest rate that makes the fully sterilized intervention policy sustainable:

$$i_t^{\max} = \frac{i^* + \dot{S}}{L_t / S_t R_t} \qquad (4)$$

It follows that there is a range of interest rates from zero to $i^{\max}$ that makes the fully sterilized intervention policy sustainable. Given that central banks typically enjoy from senioriage and inflation tax revenues, the case in which $L_t < S_t R_t$ does not seem unlikely. In these cases, the upper limit of this range would be greater than the sum of the international interest rate and the rate of variation of the nominal exchange rate.

It is important to notice that since $i^{\max}$ depends on the behavior of R_t and L_t, the range of sustainable interest rates also evolves over time. Given a set of variables and parameters of the economy (such as the inflation rate, the elasticity of money demand and the rate of variation of the exchange rate), $i^{\max}$ would tend to decrease as the interest rate set by the central bank increases. Thus, in order to keep the policy in a sustainable trend, the cumulative sterilization cost should be bounded and manageable. A key point for sustainability is therefore that the domestic interest rates set by the central bank should be "moderate" in the mentioned sense.

4. Concluding Remarks

In this paper we show that monetary and exchange rate policies targeting a SCRER are viable for developing open economies. We illustrated our argument with recent Argentine experience, which is just one of many other economies like China or India following this strategy.

It is important to notice however that when a country is trying to preserve a SCRER, monetary, exchange rate and fiscal polices should be coordinated. Otherwise, potential conflicts between domestic goals -such as the exchange rate, inflation rate and employment- might arise. Recent inflationary pressures in Argentina could be an example of conflicts arising from the lack of coordination between economic policies.

An outline of a macroeconomic regime targeting a SCRER in which monetary, exchange rate and fiscal policies are coordinated is briefly described as follows.[18] First, it is important to mention that such a macroeconomic regime does not imply segmentation between objectives and instruments. The preservation of a SCRER, the level of employment and the control of inflation set the priorities and the restrictions that the economic policy must fulfil. Monetary, exchange rate and fiscal policies should be coordinated in order to guarantee the consistency between the multiple objectives.

The exchange rate policy should focus on signalling the stability of the RER in the medium and long term, in order to set in motion the positive feedbacks mentioned in section 3. In particular, the emergence of appreciation trends should be avoided to prevent self-fulfilling bubbles that increase the monetary "costs" of buying FX interventions and also because real exchange rate appreciation may harm the profitability of tradable activities, making many of them non-viable and forcing firms to close.

The preservation of a SCRER does not mean short run indexation of the nominal exchange rate to domestic prices. The flexibility and advantages of floating nominal exchange rate in the short run should be preserved. Central bank interventions in the FX market have to achieve two conflicting goals: they have to prevent expectations of real exchange rate appreciation and allow the nominal exchange rate to float in order to discourage short-term speculative capital flows. The interval of interventions has to be narrow enough to perform the first function and wide enough to perform the second.

The FX market behaves like an asset market. Buying and selling decisions are mostly based on expectations. If central bank interventions and signals stabilize expectations around the SCRER – a necessary condition for that is the consistency of monetary, exchange rate and fiscal policies and the robustness of the external sector accounts – the market forces by themselves will tend to stabilize the exchange rate. The monetary "costs" of central bank interventions will be lower and fewer interventions will be required. For this reason, interventions should be firm, in order to clearly show to the market the willingness and strength of the monetary authority.

[18] For a detailed description of a macroeconomic regime proposal with a SCRER as an intermediate target see Frenkel (2006).

It is implicit in the above presentation of the exchange rate policy that the buying and selling flows of international currency are manageable. This means that the central bank manage to keep the policy in a sustainable path. If capital inflows are massive the cost of sterilization may turn the monetary policy unsustainable. It is important to notice however that such a situation might arise as an endogenous consequence of the exchange rate policy itself. Massive capital inflows may result from an excessively stable nominal exchange rate in the short-run, which turns speculative investments in one-way bets. Short-run volatility in the exchange rate increases the uncertainty of speculative investments and thus may reduce capital inflows, diminishing the amount and cost of interventions. This is the main reason why the exchange rate policy under a SCRER regime should preserve short run volatility.

However, massive capital inflows that make the policy unsustainable may occur even when central bank induces short-run volatility in the exchange rate. This could happen in contexts of high liquidity in international capital markets. In this kind of situations, it would make little sense to risk macroeconomic stability in order to preserve the capital account full openness principle. The preservation of the macroeconomic regime requires in this case capital account regulations, intended to restrict capital inflows and facilitate the management of exchange and monetary policies. There is a menu of measures able to accomplish this function that even when they do not work perfectly well, evidence suggests that they contribute to soften capital inflows during booms.[19] The need for controls is not permanent, they have to do their job only in a booming phase, and we now know well that booming phases do not last forever.

When there is an excess demand for international currency that turns exchange and monetary policies unmanageable, FX interventions would cause an excessive monetary contraction and the consequent rise in the interest rate would trigger a recession. The defence of some nominal exchange rate may risk a speculative attack on the central bank reserves. The situation has similarities with a fixed exchange rate regime crisis. But there is an important difference. If there are no fundamental reasons for depreciation –generated, for instance, by expectation of balance of payments deficit– fiscal and monetary policies are consistent with the targeted real exchange rate, and inflation is under control, then the macroeconomic regime should be preserved. This would only be possible if exchange controls and restrictions on capital outflows were imposed. If there are no fundamental reasons inducing the excess demand for international currency, there is no need for the controls and regulations to last for long. As described in the section 2, Argentina successfully imposed exchange controls and capital outflow regulations in mid-2002, when the run into foreign currency was mainly caused by a self-

[19] See Epstein, Grabel and Jomo (2003).

fulfilling bubble in the exchange rate. The measures were gradually softened when the buying pressure in the FX market diminished.

In a SCRER macroeconomic regime, monetary policy should not be exclusively focused on inflation. It is important to emphasize however that this regime performs a preventative role with respect to inflation acceleration. In most developing economies, the exchange rate is the main transmission mechanism of monetary impulses to the inflation rate. The SCRER precisely encourages the central bank to implement monetary policies that avoid excessive fluctuations in both the nominal and real exchange rates. In contrast, for the same reason, an exclusive inflation focus of monetary policy generates incentives towards real exchange rate appreciation.

In coordination with the other policies, monetary policy should be managed in order to attain multiple objectives. To manage monetary aggregates or set the interest rate to accomplish this goal, the central bank may have to compensate for the interventions in the FX market. Out of the extreme situations discussed above, this can be done through different instruments. The most common is the sterilization operations. In section 3, we showed that fully sterilized interventions can be carried in context of excess supply of foreign exchange and we derived the range of interest rates that make the policy sustainable in time.

Apart from sterilization, there are other instruments at hand to conduct the monetary policy under the SCRER regime. For instance, a central bank in possession of a significant amount of bank debt can manage it as an instrument for monetary control (Lavoie, 2001). Public sector deposits in the central bank can be used in analogous way. Some prudential regulations can be oriented to the same target, particularly when the problem is to constraint money expansion. The central bank, for instance, can raise the cash requirements of the banking system and thus lower the banking multiplier. Other prudential regulations can be directly focused on smoothing the selling pressure in the exchange market. For instance, if local banks are not allowed to back credits in domestic currency with liabilities in international currency and credits in international currency are limited, there are fewer incentives to the banks procuring of international funding. The existence of public banks with a significant share of the financial market can facilitate the monetary management. Public banks can be coordinated in order to help the central bank in both the management of the liquidity and the FX interventions. Through the management of these instruments the central bank should be able to keep money expansion under control.

Finally, fiscal policy should complement monetary policy in attaining inflation and employment targets in the short run. It should focus on the management of nominal aggregate demand: moderating it in cases of inflationary pressures and expanding it in the opposite situations. However, it is important to notice that since a SCRER regime is meant to promote

development and growth, inflationary pressures may be more likely than deflationary ones. Since in this regime, monetary policy typically has an expansionary bias through the buying interventions in the FX market, the role of moderating the aggregate demand to avoid inflation and real exchange rate appreciation would tend to rely on the fiscal policy. Conservative fiscal policy could also be necessary in the SCRER regime to ease central bank needs to intervene in the FX market. Public sector surpluses may be used to buy part of the excess supply in the FX market. An anti-cyclical fiscal fund intended to perform this role could be a good institution to develop in a SCRER regime.

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